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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/942,120 | 08/30/2001 | Minoru Hashida | 381AS/50347 | 6937 |

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EXAMINER

MELWANI, DINESH

ART UNIT PAPER NUMBER

3677

DATE MAILED: 01/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

SK

Office Action Summary

Application No.

09/942,120

Applicant(s)

HASHIDA ET AL.

Examiner

Dinesh N Melwani

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 5, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friend *et al.* (U.S. Patent No. 6,047,970) in view of Cather (U.S. Patent No. 4,504,067). Friend discloses a seal mechanism substantially as claimed; wherein said mechanism comprises an annular retaining member (48) and a flexible member (28) molded in one piece with the retaining member and having a flexible tip (30) and a corner comprising radii (A/C), wherein said corner is located within said flexible member in an area adjoining said flexible tip. Friend does not disclose that said radiused corner is included for the purposes of stress reduction. Cather discloses a shaft seal that teaches the use of a radiused surface (34) to reduce stress, see col. 3, lines 1-5 and 30-33. In regards to claim 5, see A in Fig. 2, which shows the absence of material in the flexible member. As it concerns claim 12, Friend, as modified by Cather, discloses a reciprocating plunger (44) and a seal mechanism (10) arrangement, comprising an annular retaining member (48), a flexible member (28) molded in one piece with the retaining member and having a flexible tip, and a stress reduction mechanism. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide

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Friend's seal mechanism with a radiused corner (A/C) to reduce the stresses associated with urging the lip of the elastomeric ring against the rod, see Friend's Abstract.

3. Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friend *et al.* (U.S. Patent No. 6,047,970) in view of Cather (U.S. Patent No. 4,504,067) further in view of Vegella (U.S. Patent No. 4,060,023). Friend, as modified by Cather, discloses a sealing mechanism substantially as claimed, wherein said mechanism has a stress reduction mechanism including a gap between the innermost diameter of said retaining member and the outside diameter of a shaft mounted in said flexible member. However, Friend, as modified by Cather, does not expressly disclose said gap being 0.9mm or less. Furthermore, Friend, as modified by Cather, does not disclose the use of a plurality of sealing mechanisms. Vegella teaches the use of clearances (a, b, and c) to prevent over-stressing (i.e. stress reduction) by the movement of a piston rod. Vegella also expressly teaches that said clearances may be as small as 0.010 in. (0.254mm), substantially less than 0.9mm. Additionally, Vegella teaches the use of a plurality of sealing mechanisms (24 in Figure 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to utilize the teachings of Vegella, in regard to the clearance dimensions and a plurality of sealing mechanisms, to modify Friend, as modified by Cather, and prevent the occurrence of excessive pressure around the sealing lip as well as providing additional sealing as afforded by the a plurality of sealing mechanisms.

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friend *et al.* (U.S. Patent No. 6,047,970) in view of Cather (U.S. Patent No. 4,504,067) further in view of Otto *et al.* (U.S. Patent No. 6,092,637). Friend, as modified by Cather, discloses a sealing mechanism substantially as claimed, wherein the inside corner of the retaining member has a curved surface.

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Friend, as modified by Cather, does not expressly disclose said curved surface having a radius of curvature equal to or larger than 0.1 mm. Otto discloses a sealing element that teaches the reduction of stress increases in proportion to the size of the radii, see column 2, lines 5-15.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Otto, in regards to the radii size, to provide Friend, as modified by Cather, with a sufficiently large stress-reducing curve. The motivation for doing so would have been to achieve an overall minimal amount of stress, thereby increasing the service life of said sealing mechanism.

5. Claims 4, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friend *et al.* (U.S. Patent No. 6,047,970) in view of Cather (U.S. Patent No. 4,504,067) further in view of Nagasawa (U.S. Patent No. 4,623,153). Friend, as modified by Cather, discloses a sealing mechanism substantially as claimed, wherein said mechanism comprises a flexible member. However, Friend does not expressly disclose said flexible member being constructed from a material being resistant to penetration of the sealed fluid, having a low-coefficient of friction as well as a swelling rate of 30% or less. For the purposes of examination and as admitted by applicant, fluorine-based rubber is considered to possess a swelling rate of 30% or less, see the Detailed Description of the Preferred Embodiments, page 14, lines 11-13. Nagasawa discloses a sealing mechanism having a flexible member (i.e. sealing lip (4)) which maybe constructed from a synthetic resin such as polytetrafluoroethylene (PTFE), wherein the PTFE, through modification, may be afforded a low coefficient of friction and made resistant to penetration of the sealed fluid, see column 4, lines 40-55. It would have been obvious to one having ordinary skill in the art at the time the invention was made, to utilize the teachings of Nagasawa, in

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regards to the use of the well-known material PTFE in construction of said flexible member, to modify Friend, as modified by Cather, such that any over-stressing caused by expansion of the sealing member is prevented. Furthermore, it would have been obvious to utilize the teachings of Nagasawa, in regards to the modification of PTFE, to provide Friend's sealing mechanism, as modified by Cather, with increased seal-ability as well as a lower-coefficient of friction, thereby increasing the service life of the sealing mechanism.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friend *et al.* (U.S. Patent No. 6,047,970) in view of Cather (U.S. Patent No. 4,504,067) further in view of Wada *et al.* (U.S. Patent No. 5,595,697). Friend, as modified by Cather, discloses a sealing mechanism substantially as claimed, wherein said sealing mechanism comprises a retaining member. Friend, as modified by Cather, does not disclose said retaining member having a plurality of through-holes. Wada discloses a sealing device that teaches the use of reinforcing ring (106) having a plurality of holes (107), see column 1, lines 30-35. It would have been obvious to one having ordinary skill in the art at the time the invention was made, to utilize the teachings of Wada, in regards to a plurality of holes on the retaining member, to facilitate securing of said of member.

7. Claims 10/1 and 10/5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Staudt *et al.* (U.S. Patent No. 3,963,014) in view of Friend *et al.* (U.S. Patent No. 6,047,970) further in view of Cather (U.S. Patent No. 4,504,067) as applied to claims 1 or 5. Staudt discloses a fuel injection pump substantially as claimed; wherein said pump is provided with a reciprocating plunger, and a cylinder which is slip-fitted with the plunger and in which a variable-volume pressurizing chamber is formed with the reciprocating motion of said plunger and sealing mechanism, see Abstract. Staudt's does not disclose that the sealing mechanism

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provided with the fuel injection pump comprises the features and limitations of the present invention. Friend, as modified by Cather, discloses a sealing mechanism substantially as claimed, but does not disclose said mechanism being provided on a fuel pump having a reciprocating plunger, and a cylinder which is slip-fitted with the plunger and in which a variable-volume pressurizing chamber is formed with the reciprocating motion of said plunger. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Friend, as modified by Cather, in regards to providing a fuel pump with a sealing mechanism with a stress reduction mechanism as claimed, to provide Staudt with a fuel pump sealing mechanism as a means of preventing fuel leakage while minimizing stresses, thereby prolonging the service life of said mechanism.

8. Claims 10/2 and 10/8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Staudt *et al.* (U.S. Patent No. 3,963,014) in view of Friend *et al.* (U.S. Patent No. 6,047,970), Cather (U.S. Patent No. 4,504,067) and Vegella (U.S. Patent No. 4,060,023) as applied to claims 2 or 8. Staudt discloses a fuel injection pump substantially as claimed; wherein said pump is provided with a reciprocating plunger, and a cylinder which is slip-fitted with the plunger and in which a variable-volume pressurizing chamber is formed with the reciprocating motion of said plunger and sealing mechanism, see Abstract. Staudt's does not disclose that the sealing mechanism provided with the fuel injection pump comprises the features and limitations of the present invention. Friend, as modified by Cather and Vegella, discloses a sealing mechanism substantially as claimed, but does not disclose said mechanism being provided on a fuel pump having a reciprocating plunger, and a cylinder which is slip-fitted with the plunger and in which a variable-volume pressurizing chamber is formed with the reciprocating motion of said plunger.

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Friend, as modified by Cather and Vegella, in regards to providing a fuel pump with a sealing mechanism with a stress reduction mechanism and clearances as claimed, to provide Staudt with a fuel pump sealing mechanism as a means of preventing fuel leakage while minimizing stresses, thereby prolonging the service life of said mechanism.

9. Claim 10/3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Staudt *et al.* (U.S. Patent No. 3,963,014) in view of Friend *et al.* (U.S. Patent No. 6,047,970), Cather (U.S. Patent No. 4,504,067) and Otto *et al.* (U.S. Patent No. 6,092,637) as applied to claim 3. Staudt discloses a fuel injection pump substantially as claimed; wherein said pump is provided with a reciprocating plunger, and a cylinder which is slip-fitted with the plunger and in which a variable-volume pressurizing chamber is formed with the reciprocating motion of said plunger and sealing mechanism, see Abstract. Staudt's does not disclose that the sealing mechanism provided with the fuel injection pump comprises the features and limitations of the present invention. Friend, as modified by Cather and Otto, discloses a sealing mechanism substantially as claimed, but does not disclose said mechanism being provided on a fuel pump having a reciprocating plunger, and a cylinder which is slip-fitted with the plunger and in which a variable-volume pressurizing chamber is formed with the reciprocating motion of said plunger. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Friend, as modified by Cather and Otto, in regards to providing a fuel pump with a sealing mechanism with a stress reduction mechanism and a radius of curvature large enough to sufficiently reduce the stress concentrations as claimed, to provide Staudt with a

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fuel pump sealing mechanism as a means of preventing fuel leakage while minimizing stresses, thereby prolonging the service life of said mechanism.

10. Claims 10/4, 10/6, and 10/7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Staudt *et al.* (U.S. Patent No. 3,963,014) in view of Friend *et al.* (U.S. Patent No. 6,047,970), Cather (U.S. Patent No. 4,504,067) and Nagasawa (U.S. Patent No. 4,623,153) as applied to claims 4, 6, or 7. Staudt discloses a fuel injection pump substantially as claimed; wherein said pump is provided with a reciprocating plunger, and a cylinder which is slip-fitted with the plunger and in which a variable-volume pressurizing chamber is formed with the reciprocating motion of said plunger and sealing mechanism, see Abstract. Staudt's does not disclose that the sealing mechanism provided with the fuel injection pump comprises the features and limitations of the present invention. Friend, as modified by Cather and Nagasawa, discloses a sealing mechanism substantially as claimed, but does not disclose said mechanism being provided on a fuel pump having a reciprocating plunger, and a cylinder which is slip-fitted with the plunger and in which a variable-volume pressurizing chamber is formed with the reciprocating motion of said plunger. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Friend, as modified by Cather and Nagasawa, in regards to providing a fuel pump with a sealing mechanism with a stress reduction mechanism and the use of PTFE as claimed, to provide Staudt with a fuel pump sealing mechanism as a means of preventing fuel leakage while minimizing stresses and increasing seal-ability as well as lower-coefficient of friction, thereby prolonging the service life of said mechanism.

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11. Claim 10/9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Staudt *et al.* (U.S. Patent No. 3,963,014) in view of Friend *et al.* (U.S. Patent No. 6,047,970), Cather (U.S. Patent No. 4,504,067) and Wada *et al.* (U.S. Patent No. 5,595,697) as applied to claim 3. Staudt discloses a fuel injection pump substantially as claimed; wherein said pump is provided with a reciprocating plunger, and a cylinder which is slip-fitted with the plunger and in which a variable-volume pressurizing chamber is formed with the reciprocating motion of said plunger and sealing mechanism, see Abstract. Staudt's does not disclose that the sealing mechanism provided with the fuel injection pump comprises the features and limitations of the present invention. Friend, as modified by Cather and Wada, discloses a sealing mechanism substantially as claimed, but does not disclose said mechanism being provided on a fuel pump having a reciprocating plunger, and a cylinder which is slip-fitted with the plunger and in which a variable-volume pressurizing chamber is formed with the reciprocating motion of said plunger. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the teachings of Friend, as modified by Cather and Wada, in regards to providing a fuel pump with a sealing mechanism with a stress reduction mechanism and a plurality of holes on the retaining member as claimed, to provide Staudt with a fuel pump sealing mechanism as a means of preventing fuel leakage while minimizing stresses and a means for securing said retaining member.

Response to Arguments

12. Applicant's arguments filed 11/1/02 have been fully considered but they are not persuasive.

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13. Applicant's arguments with respect to the Friend *et al.* have been considered but are moot in view of the new ground(s) of rejection. Friend, as modified by Cather, discloses a backing ring configured in such a manner so as to have a corner located within the flexible member for the purposes or relieving stress.

14. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dinesh N Melwani whose telephone number is 703-305-4546. The examiner can normally be reached on M-F, 8:30-6 except every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, J. J. Swann can be reached on 703-306-4115. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9326 for regular communications and 703-872-9327 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-4115.

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James R. Brittain
Primary Examiner

DNM
January 7, 2003